

What is claimed is:

1. A liquid crystal display module, comprising:
  - a light source to generate light;
  - a light guide panel through which the light from the light source propagates, the light guide panel having a first refractive index;
  - a low refractive index layer disposed on the light guide panel, the low refractive index layer having a second refractive index which is lower than the first refractive index; and
  - a transmissive liquid crystal display panel disposed on an upper portion of the lower refractive layer.
2. The liquid crystal display module according to claim 1, wherein the light in the light guide panel is totally reflected at a border between the light guide panel and the low refractive index layer when the light in the light guide panel impinges on the border at an angle of:  $90^\circ - \sin^{-1}(1/\text{the first refractive index}) > \sin^{-1}(\text{the second refractive index}/\text{the first refractive index})$ .
3. The liquid crystal display module according to claim 1, wherein the first refractive index is 1.7 and the second refractive index is 1.35.
4. The liquid crystal display module according to claim 1, further comprising:
  - optical sheets disposed on the low refractive index layer;
  - and
  - a polarizer disposed on the optical sheets to polarize light from the optical sheets.

5. The liquid crystal display module according to claim 4, wherein the transmissive liquid crystal display panel includes:  
a lower substrate disposed on the polarizer; and  
an upper substrate facing the lower substrate with liquid crystal therebetween to selectively transmit the light through the liquid crystal by driving the liquid crystal.

6. The liquid crystal display module according to claim 4, wherein the transmissive liquid crystal display panel includes an upper substrate facing the polarizer with liquid crystal therebetween to selectively transmit the light through the liquid crystal by driving the liquid crystal, and no substrate is disposed between the liquid crystal and the light guide panel.

7. The liquid crystal display module according to claim 1, further comprising:  
a condenser disposed between the light source and the light guide panel.

8. The liquid crystal display module according to claim 7, wherein the light in the light guide panel is totally reflected at a border between the light guide panel and the low refractive index layer when the light in the light guide panel impinges on the border at an angle of:  $90^\circ - \sin^{-1}(\text{the second refractive index}/\text{the first refractive index})$ .

9. The liquid crystal display module according to claim 7, wherein the first refractive index is 1.5 and the second refractive index is 1.35.

10. The liquid crystal display module according to claim 7, further comprising:

optical sheets disposed on the low refractive index layer;  
and

a polarizer disposed on the optical sheets to polarize light from the optical sheets.

11. The liquid crystal display module according to claim 10, wherein the transmissive liquid crystal display panel includes:

a lower substrate disposed on the polarizer; and

an upper substrate facing the lower substrate with liquid crystal therebetween to selectively transmit the light through the liquid crystal by driving the liquid crystal.

12. The liquid crystal display module according to claim 10, wherein the transmissive liquid crystal display panel includes an upper substrate facing the polarizer with liquid crystal therebetween to selectively transmit the light through the liquid crystal by driving the liquid crystal, and no substrate is disposed between the liquid crystal and the light guide panel.

13. The liquid crystal display module according to claim 1, wherein the low refractive index layer is disposed on a first surface of the light guide panel, and a second surface of the light guide panel that opposes the first surface has a plurality of grooves to reflect light impinging on the grooves towards the transmissive liquid crystal display panel.

14. The liquid crystal display module according to claim

1, further comprising a reflective plate disposed below the light guide panel, the reflective plate reflecting light escaping from the light guide panel and traveling away from the low refractive index layer back towards the light guide panel and the low refractive index layer.

15. A liquid crystal display module, comprising:

a light source to generate light;

a light guide panel through which the light from the light source propagates;

means for reflecting light in the light guide panel that impinges on a surface of the light guide panel at at least a critical angle and transmitting light in the light guide panel that impinges on the surface at less than the critical angle, the critical angle measured from a plane perpendicular to that formed by the surface; and

a transmissive liquid crystal display panel disposed on the reflecting means.

16. The liquid crystal display module according to claim 15, wherein the critical angle is defined by:  $90^\circ - \sin^{-1}(1/a \text{ first refractive index of the light guide panel}) > \sin^{-1}(a \text{ refractive index of the reflecting means/the refractive index of the light guide panel})$ .

17. The liquid crystal display module according to claim 16, wherein the reflecting means is disposed directly on the light guide panel.

18. The liquid crystal display module according to claim

15, further comprising:

optical sheets disposed on the reflecting means; and  
a polarizer disposed on the optical sheets to polarize light  
from the optical sheets.

19. The liquid crystal display module according to claim  
18, wherein the transmissive liquid crystal display panel includes:

a lower substrate disposed on the polarizer; and  
an upper substrate facing the lower substrate with liquid  
crystal therebetween to selectively transmit the light through the  
liquid crystal by driving the liquid crystal.

20. The liquid crystal display module according to claim  
18, wherein the transmissive liquid crystal display panel includes  
an upper substrate facing the polarizer with liquid crystal  
therebetween to selectively transmit the light through the liquid  
crystal by driving the liquid crystal, and no substrate is disposed  
between the liquid crystal and the light guide panel.

21. The liquid crystal display module according to claim  
20, wherein lower patterns are formed directly on the polarizer,  
the liquid crystal disposed between the lower patterns and the lower  
patterns.

22. The liquid crystal display module according to claim  
15, further comprising:

a light source housing reflecting the light generated by the  
light source towards the light guide plate; and

a condenser disposed between the light source and the light  
guide panel, the condenser condensing the light generated by the

light source and the light reflected by the light source housing into a smaller range of angles emitted into the light guide panel.

23. The liquid crystal display module according to claim 22, wherein the critical angle is defined by:  $90^\circ - \text{condensed degree by the condenser} > \sin^{-1}(\text{a refractive index of the reflecting means/a refractive index of the light guide panel})$ .

24. The liquid crystal display module according to claim 15, further comprising:

optical sheets disposed on the reflecting means; and  
a polarizer disposed on the optical sheets to polarize light from the optical sheets.

25. The liquid crystal display module according to claim 24, wherein the transmissive liquid crystal display panel includes:

a lower substrate disposed on the polarizer; and  
an upper substrate facing the lower substrate with liquid crystal therebetween to selectively transmit the light through the liquid crystal by driving the liquid crystal.

26. The liquid crystal display module according to claim 24, wherein the transmissive liquid crystal display panel includes an upper substrate facing the polarizer with liquid crystal therebetween to selectively transmit the light through the liquid crystal by driving the liquid crystal, and no substrate is disposed between the liquid crystal and the light guide panel.